

## **Effects of recent mountain pine beetle infestation on fire severity and post-fire regeneration in a lodgepole pine forest of Greater Yellowstone**

Brian J. Harvey\*, University of Wisconsin – Madison

Monica G. Turner, University of Wisconsin – Madison

William H. Romme, Colorado State University

Daniel C. Donato, University of Wisconsin - Madison

Martin Simard, University of Wisconsin – Madison

Phillip A. Townsend, University of Wisconsin - Madison

**Abstract:** Stand-replacing fires and mountain pine beetle (*Dendroctonus ponderosae*) outbreaks are important natural disturbances in lodgepole pine (*Pinus contorta* var. *latifolia*) forests of western North America. Both disturbances have increased in severity and extent in recent decades and are predicted to continue this trend in a warming climate over the next century, raising questions about their potential interactions. Recent studies suggest that beetle infestation may reduce fire severity, but this interaction has seldom been tested empirically. During summer 2010, we conducted field studies in a beetle-infested lodgepole pine forest that burned in 2008 to determine how landscape heterogeneity in recent beetle disturbance affected fire severity and post-fire tree establishment. We sampled 100 circular plots (30-m diameter) that burned in the ~6,000-ha New Fork Lakes Fire on the Bridger-Teton National Forest, Wyoming. Burn severity and post-fire tree seedling density were evaluated against field measures of pre-fire beetle activity and severity, pre-fire stand structure, topography and fire weather conditions. Initial analyses indicate that fire severity declined with severity of pre-fire bark beetle infestation (which ranged from 0 to 80% basal area with evidence of pre-fire beetle attack); pre-fire basal area and the day and time of burn were also significant. Post-fire lodgepole pine seedling density was abundant (median density  $>30,000 \text{ ha}^{-1}$ ), was positively correlated with the pre-fire percentage of canopy trees bearing serotinous cones, and was greatest in plots of moderate-severity burn. These results suggest that recent beetle outbreak neither increased fire severity nor compromised post-fire establishment of lodgepole pine seedlings.

**Keywords:** mountain pine beetle, *Dendroctonus ponderosae*, lodgepole pine, *Pinus contorta* var. *latifolia*, disturbance interactions

**First Topic:** Forest Ecology

**Second Topic:** Disturbance

**Oral Presentation**